LIE THEORY: PROBLEM SET 6

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1. Construct an explicit basis of $\mathfrak{su}_2$ and compute the Lie bracket for this basis.
2. Identify the Lie subgroups of $SU(2)$ corresponding to this basis.
3. Construct an explicit basis of $\mathfrak{so}_3$ and compute the Lie bracket for this basis.
4. Identify the Lie subgroups of $SO(3)$ corresponding to this basis.
5. Calculate the adjoint homomorphism

$$\mathrm{Ad}\colon SU(2) \to \mathrm{Aut}(\mathfrak{su}_2) = GL_3(\mathbb{R}).$$

($\mathrm{Ad}(g)$ is the map on Lie algebras coming from the Lie group map $SU(2) \to SU(2)$, $M \mapsto gMg^{-1}$).

REFERENCES